The Future of 4.9 GHz

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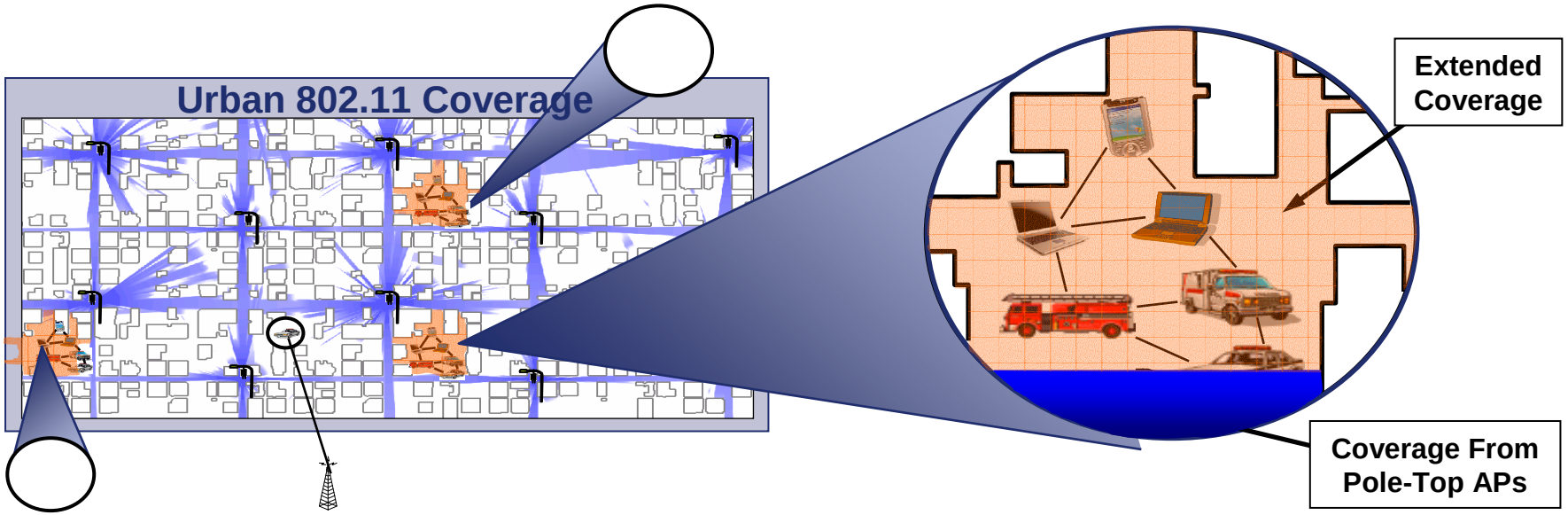
NPSTC
and
Cisco Systems
Tropos Networks
Nortel Networks
PacketHop, Inc.
Bermai, Inc.

Goal

- **Provide cost-effective mission-critical broadband services to Public Safety leveraging standards-based COTS technologies**



- **802.11 infrastructure deployments are expanding beyond traditional “hot spots” and are being deployed across entire metropolitan areas in a cellular-like manner**
- **802.11 devices are designed to avoid interference – automatic channel select, listen before talk, transmit power control**

Public Safety Agencies Are Already Deploying Broadband

- Los Angeles, CA PD: 27 WLANs at police stations throughout the city (pop. 3.8 million) ***WiFi***
- Columbus, OH PD: linked city PD to surrounding PDs (pop. 711,500) ***WiFi***
- New Orleans, LA PD: police surveillance (pop. 484,700) ***WiFi***
- Aurora, CO PD & FD : 300 mobile police and fire units (pop. 300,000) ***WiFi***
- Syracuse and Onondoga County, NY PD: (pilot) (pop. 164,000) ***WiFi***
- San Mateo, CA PD: metro scale, WiFi mesh network (pop. 92,500) ***WiFi***
- Buffalo Grove, IL PD: patrol cars & mobile incident command (pop. 42,900) ***WiFi***
- North Miami Beach, FL PD: metro area network (pop.40,800) ***WiFi***
- Post Falls, ID PD: 23 access points with up to 5 mile radius; 22 patrol cars (pop. 20,000) ***WiFi***
- Isle, MN PD: 7 member police force equipped with 802.11b (pop. 700) ***WiFi***

Public Safety Benefits from Competitive Supply

- **802.11/Mask A at 4.9 GHz provides:**
  - **Open standards-based, commercial wireless networking technology is proven**
  - **Large vendor community breeds innovation**
    - **Expanded capabilities such as IEEE 802.11e, i, n, r, s**
  - **Competition promotes competitive prices**
  - **Use of 5 GHz frequencies can supplement 4.9 GHz**

If FCC requires a non-802.11, specialized solution – vendors will simply choose not to supply to this market

Adjacent Channel Effects

- **Concurrent unrelated operations in adjacent channels in the same place are unlikely and can be managed**
  - **Single AP hot spots: No adjacent channel interference**
  - **Pre-installed infrastructure: Channel use is already coordinated**
  - **Isolated APs coming together: will be administratively managed in virtually all situations using on-site coordination using available channels**

- **Equivalent interference protection can be obtained through receiver technology**
  - **Transmitter restrictions, e.g., stricter masks, constrain all devices**

- **Even in cases where adjacent channel interference effects might be present, interference results only in reduced throughput**
  - **Example: 802.11a rates change from 54 Mbs to 6 Mbs, in steps**

Worst case: unmanaged incident

- **Two mobile command centers at the same incident**
  - **One is transmitting high resolution video at 500 kb**
  - **Second is transmitting on an adjacent channel**
- **First command center might experience decreasing bandwidth to 6 Mbs**
- **Video automatically adjusts to available bandwidth**
  - **Vast majority of cases, no change in application performance,~ 30 fps**
  - **In rare cases, current video technology gracefully handles reduced bandwidth**
    - **Reduced resolution OR**
    - **Lower frame rates**

- **Performance change is imperceptible to the user**

Prompt FCC Action Required

1. Approve mask A at or below 20dBm
2. Allow experimental licenses above 20dBm to gather more information on operational performance at higher power